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# OSTEOARTHRITIS AND ITS TREATMENT

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**ABSTRACT**
Osteoarthritis is thought to be the most prevalent chronic joint disease. The incidence of osteoarthritis is rising because of the ageing population and the epidemic of obesity. Pain and loss of function are the main clinical features that lead to treatment, including non-pharmacological, pharmacological, and surgical approaches. Clinicians recognise that the diagnosis of osteoarthritis is established late in the disease process, maybe too late to expect much help from disease-modifying drugs.
**KEY WORDS**: Proteoglycans, DJD, MRI, BMP-6

## INTRODUCTION

Osteoarthritis is caused by the breakdown of cartilage in one or more joints. Cartilage is composed of 65 to 80 percent water, collagen (fibrous proteins), proteoglycans (proteins and sugars which interweave with collagen), and chondrocytes (cells that produce cartilage). Cartilage is a hard but slippery tissue which serves as a cushion between the bones of joints, allowing the bones to glide over one another. Cartilage also absorbs shock from physical movements. When cartilage loss occurs, the joint can deteriorate to the point of rubbing bone against bone. Changes in structures around the joint (muscles and tendons), fluid accumulation, and bony overgrowth (e.g., osteophytes or bone spurs) can develop, causing severe chronic pain, loss of mobility, and disability. Osteoarthritis is also known as degenerative joint disease, DJD, wear-and-tear arthritis, and osteoarthrosis. The disease can affect joints in the fingers, hips, knees, feet, spine Osteoarthritis is a condition in which low-grade inflammation results in pain in the joints, caused by wearing of the cartilage that covers and acts as a cushion inside joints. As the bone surfaces become less well protected by cartilage, the patient experiences pain upon weight bearing, including walking and standing. Due to decreased movement because of the pain, regional muscles may atrophy, and ligaments may become more lax. Osteoarthritis is the most common form of arthritis. The word is derived from the Greek word "*osteo*", meaning "of the bone", "*arthro*", meaning "joint", and "*itis*", meaning inflammation, although many sufferers have little or no inflammation. Keeping this in mind, other closely related pathologies include pseudo-arthrosis. This is derived pseudo meaning "false" and arthrosis meaning "joint." Radiographic diagnosis results in diagnosis of a fracture within a joint, which is not to be confused with osteoarthritis which is a degenerative pathology affecting a high incidence of distal phalageal joints of female patients.[1-3]

Osteoarthritis affects nearly 21 million people in the United States, accounting for 25% of visits to primary care physicians, and half of all NSAID (Non-Steroidal Anti-Inflammatory Drugs) prescriptions. It is estimated that 80% of the population will have radiographic evidence of osteoarthritis by age 65, although only 60% of those will be symptomatic. Treatment is with NSAIDs, local injections of glucocorticoid or hyaluronan, and in severe cases, with joint replacement surgery. There has been no cure for osteoarthritis, as cartilage has not been induced to regenerate. However, if is osteoarthritis caused by cartilage damage (for example as a result of an injury) Autologous Chondrocyte Implantation may be a possible treatment. Clinical trials employing tissue-engineering methods have demonstrated regeneration of cartilage in damaged knees, including those that had progressed to osteoarthritis.[4]

### Signs And Symptoms

The main symptom is chronic pain, causing loss of mobility and often stiffness. "Pain" is generally described as a sharp ache, or a burning sensation in the associated muscles and tendons. Osteoarthritis can cause a crackling noise (called "crepitus") when the affected joint is moved or touched, and patients may experience muscle spasm and contractions in the tendons. Occasionally, the joints may also be filled with fluid. Humid weather increases the pain in many patients. Osteoarthritis commonly affects the hands, feet, spine, and the large weight-bearing joints, such as the hips and knees, although in theory, any joint in the body can be affected. As osteoarthritis progresses, the affected joints appear larger, are stiff and painful, and usually feel *worse*, the more they are used throughout the day, thus distinguishing it from rheumatoid arthritis. In smaller joints, such as at the fingers, hard bony enlargements, called Heberden's nodes (on the distal interphalangeal joints) and/or Bouchard's nodes (on the proximal interphalangeal joints), may form, and though they are not necessarily painful, they do limit the movement of the fingers significantly. Osteoarthritis at the toes leads to the formation of bunions, rendering them red or swollen. Osteoarthritis is the most common cause of *water on the knee*, an accumulation of excess fluid in or around your knee joint.[5]

### Diagnosis

Diagnosis is normally done through x-rays. This is possible because loss of cartilage, subchondral ("below cartilage") sclerosis, subchondral cysts, narrowing of the joint space between the articulating bones, and bone spur formation (osteophytes) show up clearly on x-rays. Plain films, however, often do not correlate well with the findings of physical examination of the affected joints. With or without other techniques, such as MRI (magnetic resonance imaging), arthrocentesis and arthroscopy, diagnosis can be made by a careful study of the duration, location, the character of the joint symptoms, and the appearance of the joints themselves. As yet, there are no methods available to detect in osteoarthritis its early and potentially treatable stages.

### Treatment

Generally speaking, the process of clinically detectable osteoarthritis is irreversible, and typical treatment consists of medication or other interventions that can reduce the pain of OA and thereby improve the function of the joint. Application of heat — often moist heat — eases inflammation and swelling in the joints, and can help improve circulation, which has a healing effect on the local area. No matter what the severity, or where the osteoarthritis lies, conservative measures, such as weight control, appropriate rest and exercise, and the use of mechanical support devices are usually beneficial to sufferers. In the case of osteoarthritis of the knees, a cane, or a walker can be a helpful aid for walking and support. Regular

exercise, if possible, in the form of walking or swimming, is encouraged. Applying local heat before, and cold packs after exercise, can help relieve pain and inflammation, as can relaxation techniques. Weight loss can relieve joint stress and may delay progression. Proper advice and guidance by a health care provider is important in osteoarthritis management, enabling people with this condition to improve their quality of life. Dealing with chronic pain can be difficult and result in depression. Communicating with other patients and caregivers can be helpful, as can maintaining a positive attitude. People who take control of their treatment, communicate with their health care provider, and actively manage their arthritis experience can reduce pain and improve function.

Dietary : Supplements which may be useful for treating osteoarthritis include, Glucosamine: A molecule derived from glucosamine is used by the body to make some of the components of cartilage and synovial fluid. Supplemental glucosamine may improve symptoms of osteoarthritis and delay its progression. However, a large study suggests that glucosamine is not effective in treating osteoarthritis of the knee. A subsequent meta-analysis that includes this trial concluded that glucosamine hydrochloride is not effective and that the effect of glucosamine sulfate is uncertain, Chondroitin: Boswellia, an herbal supplement known in Aryuvedic medicine. It is widely available in health food stores and online. Antioxidants, including vitamins C and E in both foods and supplements, provide pain relief from OA. Hydrolyzed collagen (hydrolysate) (a gelatin product) may also prove beneficial in the relief of OA symptoms, as substantiated in a German study by Beuker F. et al. and Seeligmuller et al. In their 6-month placebo-controlled study of 100 elderly patients, the verum group showed significant improvement in joint mobility. Ginger (rhizome) extract - has improved knee symptoms moderately.[6]

**NSAIDS Reduce Pain**

Nonsteroidal anti-inflammatory drugs (NSAIDs) NSAIDs are often used for relieving the pain of osteoarthritis. The most frequently used NSAIDs are aspirin, ibuprofen, and naproxen. Like acetaminophen, these drugs relieve pain in the affected joints. They may reduce inflammation as well, which is why they are called anti-inflammatory medications. Many NSAIDs are available over the counter, but stronger ones require a prescription from a doctor. Ibuprofen and naproxen Ibuprofen and naproxen are the two over-the-counter NSAIDs that doctors recommend most often for relieving pain caused by osteoarthritis. These drugs may be more effective than aspirin in reducing symptoms and improving movement in the joints, and they usually cause less stomach irritation than aspirin. Like aspirin, ibuprofen and naproxen can cause stomach irritation when they are used for several months or longer. This stomach irritation can eventually lead to ulcers (open sores in the lining of the stomach), which can sometimes be life-threatening. For this reason, if you are taking ibuprofen or naproxen, you should tell your doctor right away about any signs of stomach irritation (such as heartburn) or bleeding inside your stomach (such as dark stools). Your doctor is likely to recommend a lower dose of the medication or prescribe the analgesic acetaminophen, which does not cause stomach irritation. Aspirin Aspirin, which is an NSAID, is often recommended for relieving the pain of arthritis. It can be a very effective pain reliever for many people with osteoarthritis. However, in some people, long-term use of aspirin can cause ulcers. If aspirin irritates your stomach (which you may feel as heartburn or similar symptoms of stomach upset), your doctor may recommend trying the enteric-coated aspirin tablets, which do not release their contents until they reach the intestines. If you still have stomach irritation with the enteric-coated aspirin, your doctor may recommend acetaminophen, or an NSAID that is not as irritating as aspirin. Corticosteroids Corticosteroids are man-made substances that are related to cortisone, a naturally occurring hormone that your body makes. Corticosteroids are used to reduce pain and inflammation (redness, warmth, and swelling). In some cases, a doctor will give these drugs by injection directly into the affected joint. Although the shot cannot stop the progression of osteoarthritis, it may help relieve the symptoms for many months. Corticosteroids are strong drugs that can cause serious side effects, such as damage to bones and cartilage (the cushioning tissue inside joints). For this reason, these shots are given no more than a few times a year. Another type of NSAID, COX-2 selective inhibitors (such as celecoxib, and the withdrawn rofecoxib and valdecoxib) reduce this risk substantially. These latter NSAIDs carry an elevated risk for cardiovascular disease, and some have now been withdrawn from the market. Most doctors nowadays loath the use of steroids in the treatment of OA as their effect is modest and the adverse effects may outweigh the benefits. For severe pain, narcotic pain relievers such as tramadol, and eventually opioids (hydrocodone, oxycodone or morphine) may be necessary; these should be reserved for very severe cases, and are rarely medically necessary for chronic pain.[7]

**Topical Treatment**

This is a treatments designed for local application and action. Some NSAIDs are available for topical use (e.g. ibuprofen and diclofenac) and may improve symptoms without having systemic side-effects. Creams and lotions, containing capsaicin, are effective in treating pain associated with osteoarthritis if they are applied with sufficient frequency. Severe pain in specific joints can be treated with local lidocaine injections or similar local anaesthetics, and glucocorticoids (such as hydrocortisone). Corticosteroids (cortisone and similar agents) may temporarily reduce the pain. If the above management is ineffective, joint replacement surgery may be required. Individuals with very painful osteoarthritis joints may require surgery such as fragment removal, repositioning bones, or fusing bone to increase stability and reduce pain.

There are various other modalities in use for osteoarthritis:

A meta-analysis of randomized controlled trials of acupuncture for knee osteoarthritis concluded "clinically relevant benefits, some of which may be due to placebo or expectation effects". Low level laser therapy: this is a light wave based treatment that may reduce pain. The treatment is painless, inexpensive and without risks or side effects. Unfortunately, it may not actually have any real benefits. Rotational Field Quantum Magnetic Resonance has been claimed to be effective for regeneration of cartilage in the knee joints.

**Prolotherapy** (proliferative therapy): This is the injection of an irritant substance (such as dextrose) to create an acute inflammatory reaction. It is claimed to strengthen and heal damaged tissues including ligaments, tendons and cartilage as part of this reaction. The injection is painful (like corticosteroids or hyaluronic acid) and may cause an increase in pain for a few days afterwards. The only other significant risk is the rare possibility of infection.

**Radiosynoviorthesis:** A radioactive isotope (a beta-ray emitter with a brief half-life) is injected into the joint to soften the tissue. Due to the involvement of radioactive material, this is an elaborate and costly procedure, but it has a success rate of around 80%.

**Weight Loss:** Being overweight is the most common cause of excess pressure on the joints and can increase your risk of developing osteoarthritis. If you already have osteoarthritis, being overweight can speed the rate at which the cartilage in your joints wears down, worsening your symptoms. Losing weight can help relieve the pressure and strain on your joints, reducing the wear and tear that can cause damage to the tissues inside the joint. Weight loss can also help reduce the pain and stiffness in the affected joints, especially those in the hips, knees, back, and feet.

**Exercise:** Exercise also helps you reach or maintain a healthy weight, which reduces the stress on your joints. Here are some good

reasons to exercise if you have arthritis: Exercise strengthens the muscles that support your joints, which helps protect the joints from further damage and can reduce the pain of arthritis. Exercise improves the flexibility of your joints; the more flexible your joints are, the more easily you can move them without pain. Exercise can make you feel better mentally and emotionally by relieving stress and elevating your mood. Exercise can spark your energy and generally improve the quality of your life.

**Heat And Cold:** Heat Heat is usually used to relax muscles and sometimes to warm them up before exercising. You can heat up your sore joints with heating pads or hot packs or by sitting in a hot tub or heated pool. For many people who have arthritis, a hot shower in the morning is all they need to loosen their stiff joints. Cold Applying cold to a sore joint reduces the pain by numbing the area. Use ice or reusable cold packs. Never apply ice directly to your skin because it can burn the skin; wrap ice and cold packs in a towel. Although applying cold can be helpful for short-term pain relief, you have to be careful because the lack of feeling may cause you to overuse the sore joint or muscle.[8-9]

**Surgery**: Replacing a joint there are now artificial devices to replace almost any joint in the body. Joint replacement surgery is most frequently done to repair hips and knees, but is also done to repair ankles, finger joints, wrists, and toes. A successful joint replacement relieves pain and restores most of the joint's movement. For a joint replacement, the surgeon first removes all the damaged bone from the joint. Artificial replacement parts are then cemented to the healthy bone that remains. For younger people who are more active, doctors sometimes use newer artificial joints that do not require cement to stay in place. Instead, the artificial joint is designed with spaces into which the person's own bone can grow; this holds the artificial joint in place more naturally. By avoiding the use of cement, which can weaken over time, these artificial joints usually last longer than those that are held in place with cement.[10-11]

## CONCLUSION

Treatment of osteoarthritis varies with the severity of symptoms and focuses on decreasing pain and improving joint movement. Treatment plans often include a combination of drugs, rest, and physical activity, and joint protection, use of heat or cold to reduce pain, and physical or occupational therapy.

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